

**CLAIMS**

It is claimed:

1. A method for sharing a hard disk among multiple users of a computer, the method implemented on a sharing device coupled to the computer, the method comprising:
  - receiving a hard disk access command including a virtual hard disk address
  - translating the virtual hard disk address to a translated address
  - forwarding to the hard disk the access command with the translated address in place of the hard disk address.
2. The method of claim 1 further comprising:
  - receiving a response to the access command from the hard disk
  - if the response includes a hard disk address, translating the hard disk address into a virtual disk address
  - forwarding the response with the virtual disk address in place of the hard disk address.
3. The method of claim 2 further comprising:
  - if the response includes a hard disk size, translating the hard disk size into a virtual disk size
  - forwarding the response with the virtual disk size in place of the hard disk size.
4. The method of claim 1 wherein the translating comprises:
  - mapping the virtual hard disk address to a real hard disk address.
5. The method of claim 4 wherein the mapping comprises:

referring to a virtual device table.

6. The method of claim 1 wherein the translating comprises:

adding an offset to the virtual hard disk address based on virtual device identifying information stored in a virtual device table.

7. The method of claim 2 wherein the translating the hard disk address comprises:

mapping the response address to the virtual address by referring to a virtual device table.

8. The method of claim 2 wherein the translating the hard disk address comprises:

subtracting an offset from the response address based on identifying information of an active virtual device.

9. The method of claim 8 wherein the subtracting comprises:

referring to a virtual device table.

10. The method of claim 1 wherein the sharing device is one of a field programmable gate array (FPGA), a programmable logic unit (PLU), an application specific integrated circuit (ASIC).

11. The method of claim 1 wherein the sharing device is coupled between the hard disk and a motherboard of the computer.

12. The method of claim 1 wherein the sharing device is coupled to a motherboard included in the computer.

13. The method of claim 1 wherein the sharing device is included on a card to be coupled to a card slot in the computer.

14. A method for sharing a hard disk among multiple users of a computer, the method implemented on a sharing device coupled to the computer, the method comprising:

when booting for a first time,

allowing a user to designate multiple virtual devices

creating a virtual device table including identifying information for each of the virtual devices

copying an operating system and application programs to each of the virtual devices on the hard disk.

15. The method of claim 14 further comprising:

allowing the user to select an active virtual device from the virtual devices

updating the virtual device table based on the user selection of the active virtual device.

16. The method of claim 14 wherein the sharing device is one of a field programmable gate array (FPGA), a programmable logic unit (PLU), an application specific integrated circuit (ASIC).

17. The method of claim 14 wherein the sharing device is coupled between the hard disk and a motherboard of the computer.

18. The method of claim 14 wherein the sharing device is coupled to a motherboard included in the computer.

19. The method of claim 14 wherein the sharing device is included on a card to be coupled to a card slot in the computer.

20. A sharing device to be coupled with a computing device having a hard disk, the sharing device having instructions stored thereon which when executed cause the sharing device to perform operations comprising:

receiving a hard disk access command including a hard disk address

translating the hard disk address to a translated address

forwarding to the hard disk the access command with the translated address in place of the hard disk address.

21. The sharing device of claim 20 having further instructions which when executed cause the sharing device to perform operations comprising:

receiving a response to the access command from the hard disk

if the response includes a response address, translating the response address into a virtual address

forwarding the response and the virtual address.

22. The sharing device of claim 20 wherein the translating comprises:

mapping the hard disk address to an active virtual device address.

23. The sharing device of claim 22 wherein the mapping comprises:  
referring to a virtual device table.

24. The sharing device of claim 20 wherein the translating comprises:

adding an offset to the hard disk address based on identifying information of an active virtual device.

25. The sharing device of claim 24 wherein the adding comprises:  
referring to a virtual device table.
26. The sharing device of claim 21 wherein the translating the response address comprises:  
mapping the response address to the virtual address by referring to a virtual device table.
27. The sharing device of claim 21 wherein the translating the response address comprises:  
subtracting an offset from the response address based on identifying information of an active virtual device.
28. The sharing device of claim 27 wherein the subtracting comprises:  
referring to a virtual device table.
29. The sharing device of claim 20 wherein the sharing device includes at least one of a field programmable gate array (FPGA), a programmable logic unit (PLU), an application specific integrated circuit (ASIC).
30. The sharing device of claim 20 wherein the sharing device is coupled between the hard disk and a motherboard of the computing device.
31. The sharing device of claim 20 wherein the sharing device is coupled to a motherboard included in the computing device.

32. The sharing device of claim 20 wherein the sharing device is included on a card to be coupled to a card slot in the computing device.

33. A sharing device to be coupled with a computing device having a hard disk, the sharing device having instructions stored thereon which when executed cause the sharing device to perform operations allowing for sharing the hard disk among multiple users of the computing device, the operations comprising:

when booting for a first time,

allowing a user to designate multiple virtual devices

creating a virtual device table including identifying information for each of the virtual devices

copying an operating system and application programs to each of the virtual devices on the hard disk.

34. The sharing device of claim 33 having further instructions which when executed cause the sharing device to perform operations comprising:

allowing the user to select an active virtual device from the virtual devices

updating the virtual device table based on the user selection of the active virtual device.

35. The sharing device of claim 33 wherein the sharing device is one of a field programmable gate array (FPGA), a programmable logic unit (PLU), an application specific integrated circuit (ASIC).

36. The sharing device of claim 33 wherein the sharing device is coupled between the hard disk and a motherboard of the computing device.

37. The sharing device of claim 33 wherein the sharing device is coupled to a motherboard included in the computing device.

38. The sharing device of claim 33 wherein the sharing device is included on a card to be coupled to a card slot in the computing device.

39. The sharing device of claim 33 wherein the sharing device is included on the hard disk.

40. A method for sharing a storage device among multiple users of a computing device, the method implemented on a sharing device coupled to the computing device, the method comprising:

receiving a storage device access command including a virtual device address

translating the virtual device address to a translated address

forwarding to the storage device the access command with the translated address in place of the storage device address.

41. The method of claim 40 further comprising:

receiving a response to the access command from the storage device

if the response includes a storage device address, translating the storage device address

into a virtual device address

forwarding the response with the virtual device address in place of the storage device

address.

42. The method of claim 41 further comprising:

if the response includes a storage device size, translating the storage device size into a

virtual device size

forwarding the response with the virtual device size in place of the storage device size.

**43.** The method of claim 40 wherein the translating comprises:  
mapping the virtual device address to a real storage device address.

**44.** The method of claim 43 wherein the mapping comprises:  
referring to a virtual device table.

**45.** The method of claim 40 wherein the translating comprises:  
adding an offset to the virtual device address based on virtual device identifying  
information stored in a virtual device table.

**46.** The method of claim 41 wherein the translating the storage device address comprises:  
mapping the response address to the virtual address by referring to a virtual device table.

**47.** The method of claim 41 wherein the translating the storage device address comprises:  
subtracting an offset from the response address based on identifying information of an  
active virtual device.

**48.** The method of claim 47 wherein the subtracting comprises:  
referring to a virtual device table.

**49.** The method of claim 40 wherein the sharing device is one of a field programmable gate  
array (FPGA), a programmable logic unit (PLU), an application specific integrated circuit  
(ASIC).

**50.** The method of claim 40 wherein the sharing device is coupled between the storage device and a motherboard of the computing device.

**51.** The method of claim 40 wherein the sharing device is coupled to a motherboard included in the computing device.

**52.** The method of claim 40 wherein the sharing device is included on a card to be coupled to a card slot in the computing device.

**53.** The method of claim 40 wherein the sharing device is included in the storage device.

**54.** The method of claim 40 wherein the storage device is a hard disk drive.

**55.** A method for sharing a storage device among multiple users of a computing device, the method implemented on a sharing device coupled to the computing device, the method comprising:

when booting for a first time,

allowing a user to designate multiple virtual devices from the storage device

creating a virtual device table including identifying information for each of the virtual devices

copying an operating system and application programs to each of the virtual devices on the storage device.

**56.** The method of claim 55 further comprising:

allowing the user to select an active virtual device from the virtual devices

updating the virtual device table based on the user selection of the active virtual device.

57. The method of claim 55 wherein the sharing device is one of a field programmable gate array (FPGA), a programmable logic unit (PLU), an application specific integrated circuit (ASIC).

58. The method of claim 55 wherein the sharing device is coupled between the storage device and a motherboard of the computing device.

59. The method of claim 55 wherein the sharing device is coupled to a motherboard included in the computing device.

60. The method of claim 55 wherein the sharing device is included on a card to be coupled to a card slot in the computing device.

61. The method of claim 55 wherein the sharing device is included in the storage device.

62. The method of claim 55 wherein the storage device is a hard disk drive.